



# IPCC Inventory Software: Waste Sector

IPCC TFI Side Event  
Sharm el-Sheikh Climate Change Conference  
November 2022

# Major updates



Subnational disaggregation at a category level

Tier 3 methods in 2006 IPCC Guidelines (Volume 5)

Methods in Wetlands Supplement (Chapter 6)

Improvements in worksheet structure and layout

# Subnational disaggregation

- Subdivision allows estimation of emissions at subnational level (e.g., regions by climate zone)

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help

2006 IPCC Categories

Parameters Methane Correction Factor Activity Data Amount Deposited Methane Calculations Methane Recovery Summary Long Term stored C in SWDS Harvested Wood Products

Country/Territory Japan  
Region Asia - Eastern  
Climate Zone Boreal and temperate dry  
Subdivision: Subdivision\_A  
Approach Bulk waste data only  
Activity Data Population / GDP (Tier 1)

Starting year 1970  
DOCf (fraction of DOC dissimilated) 0.500  
Delay Time (months) 6  
Fraction of methane (F) in developed gas 0.500  
Conversion Factor, C to CH4 1.333333  
Oxidation Factor (OX) 0.00

DOC (Degradable organic carbon) [weight basis]  
Methane generation rate constant (k) [1 / years]  
Garden (HWP)  
Paper (HWP)  
Wood and straw (HWP)

Parameters for carbon storage  
% paper in industrial waste  
% wood in industrial waste

\* The bulk waste option is suitable for countries where default values are estimated as a percentage of total waste.  
\*\* In case of "Population / GDP", in case of "National statistics" etc.

Worksheet notes

User notes

2006 IPCC Guidelines

**Time Delay**  
The default assumption is that the reaction starts on the first of January in the year after deposition, which is equivalent to an average delay time of six months before decay to methane commences ("Delay time" = 6). It is good practice to assume an average delay of from two to six months. If a value greater than six months is chosen, evidence to support this must be provided. To make the model work, for delay times from 7 to 18 months, the number 13 in "exp2" in all the methane calculating sheets is changed to 25, and DDOCmd in columns F and G is readdressed one cell down.

Save

4.A - Subdivision

Subdivision	
Subdivision_A	
Subdivision_B	X
*	X

Default 'Unspecified' subdivision cannot be deleted but can be rename...

Save Undo Close

Gas METHANE (CH4)

# Tier 3 methods

- Estimation of N<sub>2</sub>O emissions from waste incineration based on site specific data and flue gas concentration (Equation 5.6, Chapter 5, Volume 5, 2006 IPCC Guidelines)

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help

2006 IPCC Categories

3.C - Aggregate sources and non-CO2 emissions so  
 3.C.1 - Burning  
 3.C.1.a - Burning in Forest Land  
 3.C.1.b - Burning in Cropland  
 3.C.1.c - Burning in Grassland  
 3.C.1.d - Burning in All Other Lands  
 3.C.2 - Liming  
 3.C.3 - Urea application  
 3.C.4 - Direct N2O Emissions from managed soil  
 3.C.5 - Indirect N2O Emissions from managed so  
 3.C.6 - Indirect N2O Emissions from manure ma  
 3.C.7 - Rice cultivation  
 3.C.8 - CH4 from Drained Organic Soils  
 3.C.9 - CH4 from Drainage Ditches on Organic S  
 3.C.10 - CH4 from Rewetting of Organic Soils  
 3.C.11 - CH4 Emissions from Rewetting of Mang  
 3.C.12 - N2O Emissions from Aquaculture  
 3.C.13 - CH4 Emissions from Rewetted and Cre  
 3.C.14 - Other (please specify)  
 3.D - Other  
 3.D.1 - Harvested Wood Products  
 3.D.2 - Other (please specify)  
 Waste  
 4.A - Solid Waste Disposal  
 4.A.1 - Managed Waste Disposal Sites  
 4.A.2 - Unmanaged Waste Disposal Sites  
 4.A.3 - Uncategorised Waste Disposal Sites  
 4.B - Biological Treatment of Solid Waste  
 4.C - Incineration and Open Burning of Waste  
 4.C.1 - Waste Incineration  
 4.C.2 - Open Burning of Waste  
 4.D - Wastewater Treatment and Discharge  
 4.D.1 - Domestic Wastewater Treatment and Dis  
 4.D.2 - Industrial Wastewater Treatment and Dis  
 4.E - Other (please specify)  
 Other

Waste incineration Fossil liquid incineration **N2O Emissions from Incineration of waste - Tier 3**

Worksheet  
 Sector: Waste  
 Category: Incineration and Open Burning of Waste  
 Subcategory: 4.C.1 - Waste Incineration  
 Sheet: N2O Emissions from Incineration of waste - Tier 3  
 Data

Equation 5.6

Subdivision	Type of Waste	Total Amount of Waste incinerated (IWi) (Gg Waste)	N2O emission concentration in flue gas from the incineration of waste type i (ECi) (mg N2O/m3)	Flue gas volume by amount of incinerated waste type i (FGVi) (m3/Mg)	N2O Emissions (Gg N2O)
	i	A	B	C	D = A * B * C * 10^-9
Subdivision_B	Industrial Waste	2000	5.5	25800	0.2838
Total		2000			0.2838

Uncertainties Time Series data entry...

Worksheet notes

# Wetlands Supplement

- Methods for estimation of CH<sub>4</sub> and N<sub>2</sub>O emissions from constructed wetlands for wastewater treatment

The screenshot shows the IPCC software interface. The left sidebar displays a tree view of '2006 IPCC Categories' with '4.D.1 - Domestic Wastewater Treatment' selected. The main window shows a worksheet titled 'Indirect N2O Emissions' with the following details:

- Regions and TOWs - Tier 1:** CH4 Emission Factors - Tier 1, CH4 Emissions - Tier 1, CH4 Emissions from Constructed Wetlands - Tier 1, CH4 Emission Factors - Tier 2, CH4 Emissions - Tier 2, N2O Emissions from Plants
- Sector:** Waste
- Category:** Domestic Wastewater Treatment and Discharge
- Subcategory:** 4.D.1 - Domestic Wastewater Treatment and Discharge
- Sheet:** Organically Degradable Material in Domestic Wastewater - Tier 1

The data table is titled 'Equation 6.3' and contains the following information:

Subdivision (Region, city, etc.)	Constructed Wetlands	Population - P (Capita)	Degradable organic component - BOD (kg BOD/cap/yr)	Correction factor for industrial BOD discharged in sewers (I)	Organically degradable material in wastewater - TOW (kg BOD/yr)
		A	B	C	D = A * B * C
Subdivision_A1	<input type="checkbox"/>	1650000	15.33	1.25	31618125
Subdivision_A2	<input checked="" type="checkbox"/>	550000	15.33	1	8431500
Subdivision_B	<input type="checkbox"/>	2200000	15.33	1.25	42157500
<b>Total</b>	<input checked="" type="checkbox"/>				<b>82207125</b>

A pink box highlights the 'Constructed Wetlands' column header and the checkboxes for Subdivision\_A2 and the Total row. A pink arrow points from the 'Constructed Wetlands' header to the checked checkbox for Subdivision\_A2.

Note 1: Worksheets are subject to change due to ongoing update of the software (not updated/changed in beta version 2.83)

# Improvements in worksheet structure and layout

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help

2006 IPCC Categories

Open Burning of Waste

Worksheet

Sector: Waste  
 Category: Incineration and Open Burning of Waste  
 Subcategory: 4.C.2 - Open Burning of Waste  
 Sheet: Emissions from Open Burning

Data  
 Gas: METHANE (CH4)

Equation 5.1, 5.2, 5.4, 5.5

Subdivision	Waste Category	Type of Waste	Total Amount of Waste open-burned (Wet Weight) (Gg Waste)	Methane Emission Factor (kg CH4/Gg Wet Waste)	Methane Emissions (Gg)
			A	E	F = A * E / 10 <sup>6</sup>
Subdivision_A	Municipal Solid Waste	Total MSW	Eq. 5.7 8.7381	6500	0.0568
Subdivision_B			Specified 20	6500	0.13
Total			28.7381		0.1868

Click here

Worksheet notes

Amount of waste open-burned

Equation 5.7

Region, city, etc.	Population - P (Capita)	Fraction of Population Burning Waste - Pfrac (Fraction)	Per Capita Waste Generation - MSWp (kg waste/capita/day)	Fraction of the waste amount to be burned relative to the total amount of waste treated - Bfrac (Fraction)	Number of days by year (Day)	Total Amount of MSW Open-burned - MSWb (Gg / yr)
	P	Pfrac	MSWp	Bfrac	D	MSWb = P * Pfrac * MSWp * Bfrac * D * 10 <sup>-6</sup>
Subdivision_A	200000	0.35	0.57	0.6	365	8.7381
Total						8.7381

Cancel Save

\* Base year for assessment of uncertainty in trend: 1990

Gas: METHANE (CH4)

2006 IPCC Guidelines

2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021

# Worksheets map

IPCC category	Total number of worksheets	Worksheets		
		Tier 1	Tier 2	Tier 3
4.A Solid Waste Disposal	<b>9(+3)</b>	9		
4.A.1 Managed waste disposal sites	1*			
4.A.2 Unmanaged waste disposal sites	1*			
4.A.3 Uncategorised waste disposal sites	1*			
4.B Biological Treatment of Solid Waste	<b>1</b>	1		
4.C Incineration and Open Burning of Waste	<b>4</b>			
4.C.1 Waste incineration	3	1		
		1		1**
4.C.2 Open burning of waste	1	1		
4.D Wastewater Treatment and Discharge	<b>13</b>			
4.D.1 Domestic wastewater treatment	8	6	2	
4.D.2 Industrial wastewater treatment	5	4	1	
4.E Other	<b>1***</b>		1	

Note 2: Worksheet counts show number of tabs and are subject to change due to ongoing update

\* Additional worksheets to allow reporting of CH<sub>4</sub> emissions by solid waste disposal type

\*\* Separate worksheet for Tier 3 estimation of N<sub>2</sub>O emissions from waste incineration (Equation 5.6 )

\*\*\*Implements generic equation (AD x EF). No default values are provided in the 2006 IPCC Guidelines

# Worksheets (total)

IPCC category	Total number of worksheets
4.A Solid Waste Disposal	12
4.B Biological Treatment of Solid Waste	1
4.C Incineration and Open Burning of Waste	4
4.D Wastewater Treatment and Discharge	13
4.E Other	1
<b>Sectoral total</b>	<b>31</b>



# Summary

- Subdivision allows subnational disaggregation of emission estimates and flexibility based on data availability and national circumstances
- Implements higher tier methods of the *2006 IPCC Guidelines* (Volume 5) and methods of the *Wetlands Supplement* (Chapter 6)
- Improvements in worksheet structure and layout provide more streamlined user interface
- Guidebook for Waste sector is under development

# Thank you

<https://www.ipcc-nggip.iges.or.jp/index.html>